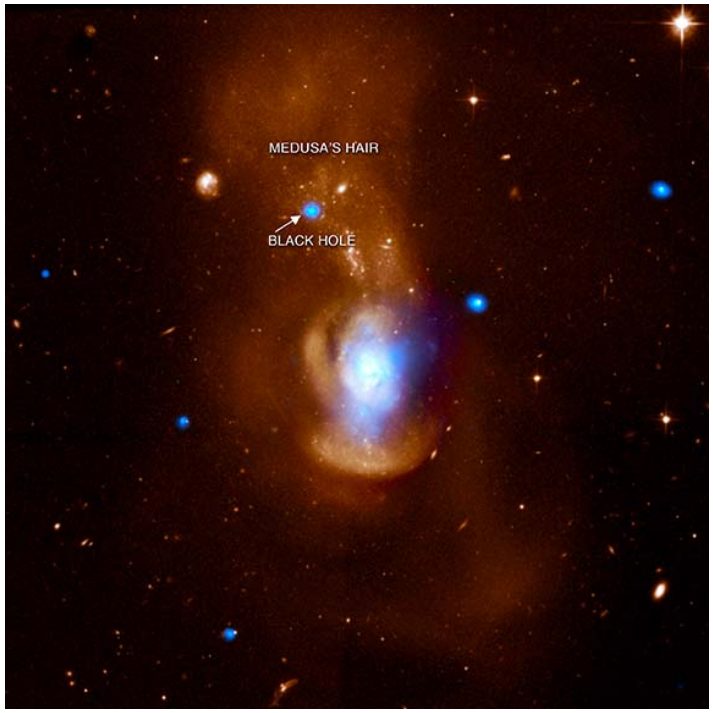
Chandra Science Highlight

NGC 4194: A Black Hole In Medusa's Hair

Chandra X-ray Observatory ACIS image



Scale: Image is 2.5 arcmin across.

Estimated Distance: About 110 million light years

This composite image of the Medusa galaxy (also known as NGC 4194) shows X-ray data from NASA's Chandra X-ray Observatory in blue and optical light from the Hubble Space Telescope in orange. Located above the center of the galaxy and seen in the optical data, the "hair" of the Medusa, is a tidal tail formed by a collision between galaxies. The bright X-ray source found toward the left side of Medusa's hair is an X-ray binary source produced by matter swirling from a star toward its black hole companion. The diffuse glow in the central region of the galaxy is likely due to diffuse hot gas and the combined emission of a number of X-ray binaries.

- A recent study of the Medusa galaxy and nine other galaxies measured the correlation between the formation of stars and the production of X-ray binary sources.
- The ratio of X-ray luminosity in the 2-10 keV band, L(2-10 keV), to the star formation rate in solar masses per year, SFR, was determined to be: $L(2\text{-}10\ keV)/10^{40}$ erg/sec = 0.37 SFR. This ratio may provide a method of using X-ray luminosity to measure the star formation rate in distant galaxies.
- The ratio of mass accreted onto neutron stars and black holes to the mass used to form stars was found to be ~1:1,000,000, a number that will be useful in constraining models of X-ray binary formation in actively star-forming galaxies.

Credit: X-ray: NASA/CXC/Univ of Iowa/P.Kaaret et al.; Optical: NASA/ESA/STScI/Univ of Iowa/P.Kaaret et al.

Reference: P. Kaaret and A. Alonso-Herrero, (2008) Astrophys.J. 682, 1020

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